AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (previously presented): An optical repeater, comprising:

a demultiplexer for dividing an inputted light into two components;

a single semiconductor optical amplifier having two separate input paths for inputting said two components of light outputted from said demultiplexer, each of said input paths of said semiconductor optical amplifier including an active layer that has one type of structure selected from a group composed of a quantum dot, a quantum wire, a quantum dash, and a quantum well, and amplifying both of said components of a light outputted from said demultiplexer; and

a multiplexer for coupling two components of a light separately outputted from said semiconductor optical amplifier,

wherein said demultiplexer is a polarization beam splitter for dividing the inputted light into two components that are orthogonal to each other.

Claim 2 (canceled)

Claim 3 (original): The optical repeater according to claim 1, wherein said demultiplexer divides the inputted light into a TE wave and a TM wave.

Claim 4 (original): The optical repeater according to claim 1, wherein said demultiplexer and said multiplexer are monolithically integrated with said semiconductor optical amplifier.

Claim 5 (original): The optical repeater according to claim 1, wherein said demultiplexer and said multiplexer are integrated as a PLC with said semiconductor optical amplifier.

Claim 6 (original): The optical repeater according to claim 1, further comprising:

a variable optical attenuator for attenuating a light outputted from said multiplexer;

an output detector for detecting an intensity of a light outputted from said variable optical attenuator; and

an output controller for controlling an intensity of an output signal by controlling operation of said variable optical attenuator based on the intensity detected by said output detector.

Claim 7 (original): The optical repeater according to claim 1, further comprising:

an input detector for detecting an intensity of the inputted light;

a variable optical attenuator for attenuating a light outputted from said multiplexer;

an output detector for detecting an intensity of a light outputted from said variable optical

attenuator; and

a gain controller for controlling a gain by controlling operation of said variable optical attenuator based on the intensity detected by said input detector and the intensity detected by said output detector.

Claim 8 (currently amended): An optical repeater, comprising:

a demultiplexer for dividing an inputted light into a TE wave and a TM wave;

a converter for converting the TM wave into a TE wave; a multiplexer for coupling a TE wave outputted from said demultiplexer and a TE wave outputted from said converter; [[and]]

a single semiconductor optical amplifier including an active layer that has one type of structure selected from a group composed of a quantum dot, a quantum wire, a quantum dash, and a quantum well, and amplifying a light outputted from said multiplexer; and

a gain equalizer for controlling a gain of a light outputted from said semiconductor optical amplifier within a range within a predetermined wavelength band.

Claim 9 (original): The optical repeater according to claim 8, further comprising a phase controller for controlling a phase of the TE wave outputted from said demultiplexer so that the TE wave intensifies with a TE wave outputted from said converter in said multiplexer.

Claim 10 (original): The optical repeater according to claim 8, wherein said demultiplexer, said converter and said multiplexer are monolithically integrated with said semiconductor optical amplifier.

Claim 11 (original): The optical repeater according to claim 8, wherein said demultiplexer, said converter and said multiplexer are integrated as a PLC with said semiconductor optical amplifier.

Claim 12 (original): The optical repeater according to claim 8, further comprising:

a variable optical attenuator for attenuating a light outputted from said semiconductor optical amplifier;

an output detector for detecting an intensity of a light outputted from said variable optical attenuator; and

an output controller for controlling an intensity of an output signal by controlling operation of said variable optical attenuator based on the intensity detected by said output detector.

Claim 13 (original): The optical repeater according to claim 6, wherein said variable optical attenuator and said output detector are monolithically integrated with said semiconductor optical amplifier.

Claim 14 (original): The optical repeater according to claim 12, wherein said variable optical attenuator and said output detector are monolithically integrated with said semiconductor optical amplifier.

Claim 15 (original): The optical repeater according to claim 6, wherein said variable optical attenuator and said output detector are integrated as a PLC with said semiconductor optical amplifier.

Claim 16 (original): The optical repeater according to claim 12, wherein said variable optical attenuator and said output detector are integrated as a PLC with said semiconductor optical amplifier.

Claim 17 (original): The optical repeater according to claim 8, further comprising:

an input detector for detecting an intensity of the inputted light;

a variable optical attenuator for attenuating a light outputted from said multiplexer;

an output detector for detecting an intensity of a light outputted from said variable optical attenuator; and

a gain controller for controlling a gain by controlling operation of said variable optical attenuator based on the intensity detected by said input detector and the intensity detected by said output detector.

Claim 18 (original): The optical repeater according to claim 7, wherein said input detector, said variable optical attenuator and said output detector are monolithically integrated with said semiconductor optical amplifier.

Claim 19 (original): The optical repeater according to claim 17, wherein said input detector, said variable optical attenuator and said output detector are monolithically integrated with said semiconductor optical amplifier.

Claim 20 (original): The optical repeater according to claim 7, wherein said input detector, said variable optical attenuator and said output detector are integrated as a PLC with said semiconductor optical amplifier.

Claim 21 (original): The optical repeater according to claim 17, wherein said input detector, said variable optical attenuator and said output detector are integrated as a PLC with said semiconductor optical amplifier.

Claim 22 (original): The optical repeater according to claim 1, further comprising a gain equalizer for controlling a gain of a light outputted from said semiconductor optical amplifier within a range within a predetermined wavelength band.

Claim 23 (canceled)

Claim 24 (original): The optical repeater according to claim 22 wherein said gain equalizer is integrated on a semiconductor substrate with said semiconductor optical amplifier.

Claim 25 (currently amended): The optical repeater according to claim [[23]] 8, wherein said gain equalizer is integrated on a semiconductor substrate with said semiconductor optical amplifier.

Claim 26 (original): The optical repeater according to claim 1 wherein said optical repeater is used as a 1R repeater.

Claim 27 (original): The optical repeater according to claim 8 wherein said optical repeater is used as a 1R repeater.

Claim 28 (previously presented): The optical repeater according to claim 8, wherein said demultiplexer is a polarization beam splitter dividing the inputted light into the TE wave and the TM wave.